

Neurocritical Care and Acute Care Neurosurgery Fellowship: Goals, Objectives, Competencies Per Curricular Element

Curricular Element	Primary Objective	Patient Care	Medical Knowledge Focus	Focus on Interpersonal and Communication Skills	Focus on Professionalism	System-Based Practice	Other Focused Goals and Objectives
Neurocritical Care Unit (NCCU) Primary and Consultative	To expand the knowledge base, clinical skills, and technical expertise of the fellow in both the primary and consultative practice of neurocritical care (NCC)	Yes	Comprehensive care of the neurocritical patient including technical and interpretative procedural skills supporting development of knowledge base and practice relevant to neurological disease states, general critical care, and procedural skills including, but not limited to: transcranial dopplers, EEG interpretation, intracranial monitoring, ventilator management, cardiopulmonary and hemodynamic support, line insertion, airway and ventilator management, bronchoscopy, focused cardiac ultrasound, pulmonary and vascular ultrasound; consultations on patients with acute neurosurgical and neuromedical issues in medical, surgical and trauma intensive care units (ICU)	Yes	Yes	Yes	Foster development of medical knowledge, skills and experience in: NCC administration, collaborative practice, multi-specialty care delivery, professionalism, interpersonal and communication skills, systems-based practice, neuroethics, and humanistic care.
Acute Care Neurosurgery	To expand the knowledge base, clinical skills, and technical expertise of the fellow in the practice of cranial and spinal neurosurgical emergencies.	Yes	Comprehensive care of the emergency neurosurgery patient including, but not limited to operative and non-operative management of traumatic and non-traumatic brain injury; spinal cord injury; spine fractures including, bracing, reduction, and stabilization techniques; penetrating cranial and spinal injuries; complex skull fractures; traumatic CSF leaks and encephaloceles; pediatric neurotrauma; triage and surgical management of polytrauma patients; bedside procedures (including ventriculostomy, ICP monitors, lumbar drains, etc); outpatient follow-up of operative and non-operative cranial and spine trauma.	Yes	Yes	Yes	Foster development of surgical knowledge, skills, and experience in: acute cranial and spinal neurosurgical emergencies, trauma systems, collaborative practice, multi-specialty care delivery, professionalism, interpersonal and communication skills, systems-based practice, neuroethics, and outpatient follow-up.
ENFOLDED CURRICULAR ELEMENTS AND DETAILED FOCUS AREAS							
Transcranial Doppler (TCD)	To enhance the fellow's confidence and skill in bedside performance and interpretation of TCDs	Yes	Applications of transcranial Doppler ultrasound in medicine; Full course (performance and interpretation of 100 supervised TCDs) provides eligibility to sit for TCD exam	Yes, preparation and communication of reports	Yes	Yes	
EEG Reading	To gain exposure and basic proficiency with ICU EEG interpretation	Yes	The fellow will interface with the NCC attending in a dedicated curriculum based on current NCCU patients continuously monitored with EEG	Yes, preparation and communication of reports	Yes	Yes	
Airway	To facilitate knowledge and skill development in direct and video laryngoscopy, airway	Yes	This element primarily covers airway anatomy, emergency airway management, concepts of airway management in the sedated patient,	During this rotation the fellows will enhance their airway vocabulary and learn to effectively interface with	Yes	No	

	maintenance of patients with depressed consciousness and endotracheal intubation		direct laryngoscopy and endotracheal intubation. The relevant procedural accomplishments in each of these specific areas will be completed during the rotation	anesthesiologists in airway crisis			
General ICU Procedures	Theoretical and practical skills in ultrasound-guided bedside procedures including PICC placement and central line insertion	Yes	The use of ultrasound for general bedside procedures	Yes, as a care team member performing the procedure	Yes	Yes	
Ethics	To enhance the fellow's background and awareness of the ethical principles that serve as the substrate for contemporary neurocritical care and neurosurgery practice	Yes	This rotation is a focused period when the fellow will concentrate on the foundation of neurological prognostication, brain death, organ donation, and the ethical/legal aspects of critical care medicine and neurosurgery.	During this rotation, the fellow with his/her faculty mentors will have the opportunity to learn more about the basic concepts of verbal and nonverbal communication, listening skills, and patient/family educational strategies to be most effective in the many complex prognosis-based discussions of the neurocritical care/neurosurgery specialist.	Yes	Yes	Practical experience while on service will be complemented by a formal M&M – format conference quarterly during which the fellow will present a patient case and lead discussion focused on ethical principles.
Interdisciplinary Conferences (Pulmonary/Critical Care, Neurosurgery, Trauma Quality Conference, ED didactic series)	To participate in interdisciplinary conferences in order to learn, to educate others, and to manage trauma, cerebrovascular diseases, pediatric emergencies, etc. in a collaborative fashion	No	Management of acute neuromedical and neurosurgical issues, and acute and chronic cerebrovascular disease, trauma, and pediatric emergencies.	Learning through case-based weekly discussions in a multidisciplinary setting	Yes	Yes	
NCCU and Acute Care Neurosurgery Didactic series	To participate in a 17-week didactic series running through the year and including case presentations and simulations highlighting NCCU/Acute Care Neurosurgery topics and skills at an advanced level	No	Topics 1) NCCU principles, ischemia, herniation, intracranial HTN 2) Operative and non-operative management of cranial and spinal injuries 3) ICH; anticoagulant reversal 4) Delirium/withdrawal/coma/brain death 5) Status epilepticus 6) Acute ischemic stroke 7) Neuromuscular emergencies 8) Traumatic brain injury 9) Sepsis, shock, fluid resuscitation, transfusion 10) Mechanical ventilation, vent wean, COPD, ARDS, PE, PNA 11) Renal failure; renal replacement therapy; nutrition ⁷ acid-base and electrolyte abnormalities 12) Neurosurgical complications 13) Post cardiac-arrest management, prognosis 14) Acute spinal cord injury 15) Metabolic and toxic	Yes	Yes	Yes	The fellow will also generate 3-5 lectures on a topic of interest in order to study a relevant topic in depth and then educate others on it. The fellow will be mentored on the effectiveness of the lecture and presentation style.

			encephalopathies (serotonin syndrome, neuroleptic malignant syndrome) 16) Medical topics: initial management of AMI, DKA, GIB, meningitis, aortic dissection 17) Aneurysmal SAH				
Journal Club (quarterly)	To foster skills for critically reviewing and presenting the literature	No	Evaluation of clinical trial design and critical interpretation of clinical trial results	Learning through topical journal clubs throughout the year	Yes	No	Learn how to critically evaluate published clinical data using accepted methodologies, e.g., GRADE
ACLS, ATLS (optional)	Training in most current ACLS protocol	No	Learn and perform the most current resuscitation protocol	Yes	Yes	Yes	
Individualized Curricular Elements	Statistics, Basic Research Education, Trauma registries, Big Data and Outcomes research, Other hospital services, e.g., SICU, MICU, Heart Failure, Cardiology Infectious Disease, Nephrology, ENT etc.	Yes/No	Individualized	Yes/No	Yes	Yes/no	

Curriculum Structure and Schedule

While in the neurocritical care unit (NCCU) the fellow will be present hours 7 AM-7 PM on average 6 days per week with 3 hours protected for administrative and academic work. While on service in the NCCU the fellow will gain experience in primary patient care, consultative work and ICU leadership. The fellow will be expected to independently function by the ninth month at which point attending physician supervision will become less obvious in order to foster experience as an independent neurointensivist while still in a training environment. While rotating in other ICUs or hospital services (as part of Individualized Curricular Elements) the fellow will have the same hours and responsibilities that fellows are typically expected to perform.

While on the Acute Care Neurosurgery component the fellow will cover operative cases and call for cranial and spinal neurosurgical emergencies including gaining experience in surgical decision-making, operative techniques, and outpatient follow-up of operative and non-operative patients. The fellow will be expected to function independently in most operative situations by the ninth month with gradually decreasing attending physician supervision in order to foster experience as an independent neurosurgeon while still in a training environment.

Time allocation

48 wks/yr NCCU/Acute Care Neurosurgery

Days: NCCU

Nights: home call for Neurosurgical Cranial and Spinal Emergencies (not to exceed 15 nights per month including every other weekend).

4 wks/yr: Vacation